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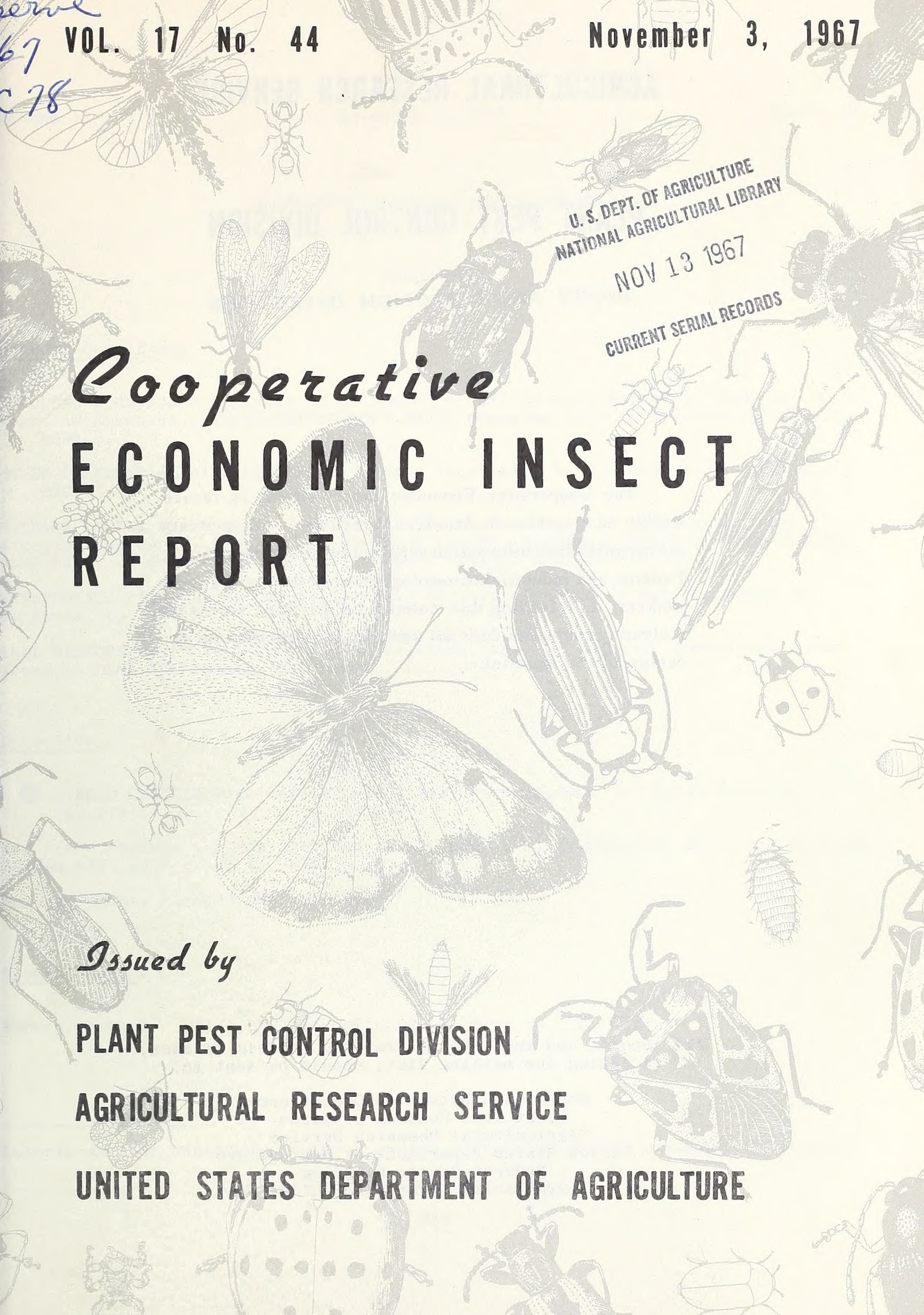

Cooperative
ECONOMIC INSECT REPORT

Issued by

PLANT PEST CONTROL DIVISION
AGRICULTURAL RESEARCH SERVICE
UNITED STATES DEPARTMENT OF AGRICULTURE

AGRICULTURAL RESEARCH SERVICE

PLANT PEST CONTROL DIVISION

SURVEY AND DETECTION OPERATIONS

The Cooperative Economic Insect Report is issued weekly as a service to American Agriculture. Its contents are compiled from information supplied by cooperating State, Federal, and industrial entomologists and other agricultural workers. In releasing this material the Division serves as a clearing house and does not assume responsibility for accuracy of the material.

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Hyattsville, Maryland 20782

Volume 17 November 3, 1967 Number 44

COOPERATIVE ECONOMIC INSECT REPORT

HIGHLIGHTS

Current Conditions

EUROPEAN CORN BORER lightest in 13 years in Hall County, Nebraska; lightest in 3 years in Arkansas. SOUTHWESTERN CORN BORER damaging corn in northern Arkansas. (p. 969)

THREE-CORNERED ALFALFA HOPPER very heavy on alfalfa in 2 counties of Arizona. (p. 970).

CABBAGE LOOPER major problem on vegetables in Yuma County, Arizona; heavily damaging commercial cabbage in Jefferson County, Alabama. IMPORTED CABBAGEWORM very heavy in commercial cabbage in above area of Alabama. (p. 971).

SWEETPOTATO FLEA BEETLE damage lightest in several years on Eastern Shore of Maryland. (p. 971).

FALL WEBWORM heavy in 2 counties of Oklahoma; heavily damaging pecans and shade trees in Dona Ana County, New Mexico. (pp. 971, 972).

Detection

● A SEED CHALCID reported in California; first record for North America. (p. 971).

New State records include SOUTHERN CHINCH BUG in California (p. 970), and a FALSE SPIDER MITE in Florida (p. 972).

For new county records see page 974.

Special Report

Survey Methods. Selected References 1962. Part IV. (p. 977).

Reports in this issue are for week ending October 27 unless otherwise indicated.

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WEATHER BUREAU'S 30-DAY OUTLOOK

NOVEMBER 1967

The Weather Bureau's 30-day outlook for November calls for above normal temperatures in the Atlantic Coast States and also along the Pacific coast. Below normal temperatures are expected to prevail in central and southern portions of the western Plateau and in the central and southern Plains. In unspecified areas, near normal temperatures are indicated. Precipitation is expected to exceed normal over most of the area lying between the Appalachians and the Continental Divide, except for near normal amounts over the northern Plains. Rainfall amounts in excess of normal are also expected over the Pacific Northwest. Subnormal rainfall is indicated in the South Atlantic States and also over the central Plateau region and South Pacific coast. In areas not specified, near normal amounts are in prospect.

Weather forecast given here is based on the official 30-day "Resume and Outlook" published twice a month by the Weather Bureau. You can subscribe through the Superintendent of Documents, Washington, D. C. 20250. Price $5.00 a year.

For Weather of the Week see page 976.

SPECIAL INSECTS OF REGIONAL SIGNIFICANCE

ARMYWORMS - SOUTH CAROLINA - Reported in Greenwood County lawns. (Nettles et al., Oct. 24). CALIFORNIA - Pseudaletia unipuncta larvae moderate on lawn at Oroville, Butte County. (Cal. Coop. Rpt.).

CORN EARWORM (Heliothis zea) - NEW MEXICO - Controls still common on lettuce in Mesilla Valley, Dona Ana County. (N.M. Coop. Rpt.). OKLAHOMA - Averaged 12 per 10 sweeps in Payne County alfalfa. (Okla. Coop. Sur.). NEBRASKA - Heavy on some late corn in southeast area. (Keith). MISSISSIPPI - Third and fourth instars averaged 7 per 50 sweeps in Oktibbeha County alfalfa. (Dinkins). SOUTH CAROLINA - Damage moderate to soybeans throughout Hampton County; control difficult. (Nettles et al., Oct. 24). MARYLAND - Larvae moderate in 10 acres of late soybeans October 20 near Salisbury, Wicomico County. Pod damage currently moderate to late soybeans near Chestertown, Kent County. (U. Md., Ent. Dept.).

GREENBUG (Schizaphis graminum) - SOUTH DAKOTA - Total of 115 aphids per 40 feet of drill row in winter wheat at southeast area experiment station in Clay County; most numerous of 5 aphid species. (Kieckhefer). NEBRASKA - Ranged 0-25 per linear foot in 3 wheat fields in Saunders and Butler Counties; light in 2 wheat fields in Pawnee County; damaging numbers remain in some central areas. (Keith). KANSAS - Continues economic on some early planted wheat in western third of State; some controls still being applied. (Simpson). NEW MEXICO - Averaged 2-5 per linear foot on wheat in Curry and Chaves Counties. (Mathews, Nielsen). COLORADO - Damaging winter wheat in Yuma County. (Hantsbarger).

SPOTTED ALFALFA APHID (Therioaphis maculata) - OKLAHOMA - Damage heavy in young alfalfa stands in Major County. (Okla. Coop. Sur.). WISCONSIN - Averaged 2 per sweep in few alfalfa fields in western Dane County. (Wis. Ins. Sur., Oct. 20).

CORN, SORGHUM, SUGARCANE

EUROPEAN CORN BORER (Ostrinia nubilalis) - NORTH DAKOTA - Fall survey completed; only 5 counties included. Population low and decreased compared with 1966. Borers averaged 101 per 100 plants compared with 190 in 1966. Parasitism by a eulophid wasp (Sympiesis viridula) very low; less than 1.5 percent of borers parasitized. (Brandvik). NEBRASKA - Fall survey completed in Hall and Cuming Counties; populations generally low. Lowest in 13 years in Hall County; borers averaged 11,648 per acre and 65.7 per 100 stalks with 61.8 percent of stalks infested. In Cuming County, borers averaged 8,791 per acre and 61.4 per 100 stalks with 52.3 percent of stalks infested. (Hill). ARKANSAS - Limited survey conducted due to continued decline in corn acreage; 60,000 acres in 1967 compared with 76,000 acres in 1966 and 10-year average of 251,000 acres. Borers per 100 stalks in 1967 averaged 8.3 in northwest, zero in north-central, and 17 in northeast. State average 10 borers per 100 stalks compared with 73 in 1967. Infestation lightest for past 3 years. (Ark. Ins. Sur.).

SOUTHWESTERN CORN BORER (Zeadiatraea grandiosella) - ARKANSAS - Percent lodged stalks by district averaged 3.3 in northwest, 0.3 in north-central, 8.6 in northeast. Lodged stalks per acre by district: Northwest 235, north-central 20, northeast 935. (Ark. Ins. Sur.).

A CRAMBID MOTH (Chilo loftini) - ARIZONA - Light on small sugarcane experimental plot at Mesa, Maricopa County. (Ariz. Coop. Sur.).

SMALL GRAINS

FALL ARMYWORM (Spodoptera frugiperda) - ALABAMA - Larvae heavily damaging fall grazing mixtures in Morgan County and present in fescue and clover mixtures in several Randolph County fields; much concern about damage to small grains this fall. (Rutledge et al.). OKLAHOMA - Decreasing in Garvin and Hughes Counties;

heavy in isolated wheat fields in Cleveland County; ranged 1-2 per square foot in Mayes County wheat. (Okla. Coop. Sur.).

A CRAMBID MOTH (Chilo loftini) - ARIZONA - Heavy on 60 acres of millet at Queen Creek, Maricopa County. (Ariz. Coop. Sur.).

A WHITE GRUB (Phyllophaga sp.) - NEW MEXICO - Larvae destroyed most of 40-acre wheat stand in Curry County. (Nielsen, Mathews).

TURF, PASTURES, RANGELAND

SOUTHERN CHINCH BUG (Blissus insularis) - CALIFORNIA - Moderate on St. Augustine grass in Whittier, Los Angeles County, September 26, 1967. Collected by J. Emoto. Det. by J. L. Herring. This is a new State record. (Cal. Coop. Rpt.). FLORIDA - Killed 5 acres of 80-acre St. Augustine grass pasture at ranch near Bell Glade, Palm Beach County; controls required. (Genung).

NORTHERN MASKED CHAFER (Cyclocephala borealis) - MARYLAND - Larvae heavy and damaging 2 bluegrass lawns in Silver Spring, Montgomery County. (U. Md., Ent. Dept.).

AN OLETHREUTID MOTH (Bactra verutana chrysea) - CALIFORNIA - Larvae heavy in nutgrass at Wasco, Kern County. (Cal. Coop. Rpt.).

A MARCH FLY (Dilophus orbatus) - CALIFORNIA - Adults heavy on turf lawns at Salinas, Monterey County. (Cal. Coop. Rpt.).

FORAGE LEGUMES

PEA APHID (Acyrthosiphon pisum) - NEW MEXICO - Damaging young alfalfa stand at Malaga, Eddy County, controls applied (Craft); mostly light in rest of State (N.M. Coop. Rpt.). ARKANSAS - Less than 100 per 100 sweeps in alfalfa in Independence County. (Boyer, Roberts, Oct. 20). MISSISSIPPI - Light, 25 per 50 sweeps, in Oktibbeha County alfalfa. (Dinkins). IOWA - Light in east-central area alfalfa. (Iowa Ins. Sur.). WISCONSIN - Increasing in some alfalfa in western Dane County; rarely higher than 20 per sweep. (Wis. Ins. Sur., Oct. 20).

THREE-CORNERED ALFALFA HOPPER (Spissistilus festinus) - MISSISSIPPI - Adults moderate to heavy, 36 per 50 sweeps, in Oktibbeha County alfalfa. (Dinkins). OKLAHOMA - Averaged 20 per 10 sweeps in Payne County alfalfa. (Okla. Coop. Sur.). ARIZONA - Counts per 100 sweeps in alfalfa averaged 550 in Maricopa County and 3,200 in Wellton, Roll, and Texas Hill areas of Yuma County; girdling in some Yuma County fields. (Ariz. Coop. Sur.).

SPOTTED CUCUMBER BEETLE (Diabrotica undecimpunctata howardi) - MISSISSIPPI - Adults heavy, 53 per 50 sweeps, in Oktibbeha County alfalfa. (Dinkins). OKLAHOMA - Averaged 8 per 10 sweeps in Payne County alfalfa. (Okla. Coop. Sur.). IOWA - Occasional in east-central area alfalfa. (Iowa Ins. Sur.).

SWEETCLOVER WEEVIL (Sitona cylindricollis) - IOWA - Averaged 11 per 25 sweeps in alfalfa and clover mixture in Clinton County. (Iowa Ins. Sur.).

CLOVER LEAF WEEVIL (Hypera punctata) - WISCONSIN - Second instars in some Kenosha County alfalfa; adults less numerous than in 1966. (Wis. Ins. Sur., Oct. 20).

TARNISHED PLANT BUG (Lygus lineolaris) - MISSISSIPPI - Adults moderate, 20 per 50 sweeps, in Oktibbeha County alfalfa. (Dinkins). OKLAHOMA - Averaged 60 per 10 sweeps in Payne County alfalfa. (Okla. Coop. Sur.). IOWA - Averaged 36 per 25 sweeps in Clinton County alfalfa. (Iowa Ins. Sur.).

LYGUS BUGS (Lygus spp.) - ARIZONA - Adults and nymphs in alfalfa averaged 190 per 100 sweeps in Yuma County and 60 in Maricopa County. (Ariz. Coop. Sur.). NEW MEXICO - Averaged 4-7 per 25 sweeps on Chaves County alfalfa. (Mathews).

ALFALFA CATERPILLAR (Colias eurytheme) - NEW MEXICO - Adults very numerous on alfalfa in Valencia and Bernalillo Counties. (Heninger). ARKANSAS - Larvae 8-10 per 100 sweeps in Independence County. (Boyer, Roberts, Oct. 20).

COTTON

SALT-MARSH CATERPILLAR (Estigmene acrea) - ARIZONA - Increasing and migrating to adjacent crops in Pima, Pinal, Maricopa, and Yuma Counties; controls and barriers necessary in many areas. (Ariz. Coop. Sur.).

STINK BUGS - NEW MEXICO - Damaged cotton bolls averaged 1-5 per 25-boll sample in Luna County fields. (Hare).

BOLL WEEVIL (Anthonomus grandis) - MISSISSIPPI - Adults light, 5 per 100 squares and small bolls, in some Yazoo County fields. (Dinkins).

COLE CROPS

CABBAGE LOOPER (Trichoplusia ni) - ALABAMA - Damage to cabbage heavy on commercial plantings in Jefferson County and light to moderate on some Baldwin County plantings. (Griffin, Turner).

IMPORTED CABBAGEWORM (Pieris rapae) - ALABAMA - Larvae very heavy on commercial cabbage plantings in Jefferson County. (Griffin).

GENERAL VEGETABLES

CABBAGE LOOPER (Trichoplusia ni) - ARIZONA - Major problem in Yuma County, controls applied every 3-4 days; eggs averaged 3 per plant in most Maricopa County lettuce. (Ariz. Coop. Sur.). NEW MEXICO - Controls continue on lettuce in Mesilla Valley, Dona Ana County. (N.M. Coop. Rpt.).

SWEETPOTATO FLEA BEETLE (Chaetocnema confinis) - MARYLAND - Root damage to sweetpotatoes lightest in several years on Eastern Shore. (U. Md., Ent. Dept., Oct. 20).

DECIDUOUS FRUITS AND NUTS

A SEED CHALCID (Megastigmus pistaceae Walker) - CALIFORNIA - Adults and larvae very light in Pistacia vera var. kerman at Plant Introduction Station, Chico, Butte County. First larva collected October 6, 1967, by J. Street. Adults collected later by W. W. Wiard and L. Browning. Det. by M. Wasbauer, confirmed by B. D. Burks. This is the first record for North America and California. Pistachio is grown commercially in 22 counties. This chalcid known in Mediterranean area, Middle East, Asia, China, and U.S.S.R. where it is a serious pest. (Cal. Coop. Rpt.).

FALL WEBWORM (Hyphantria cunea) - OKLAHOMA - Heavy in Mayes and Bryan Counties. (Okla. Coop. Sur.). NEW MEXICO - Moderate to heavy on pecan in Luna County (Hare); damage heavy on pecan over much of Dona Ana County. (N.M. Coop. Rpt.).

HICKORY SHUCKWORM (Laspeyresia caryana) - ALABAMA - Nut harvest underway. Larvae heavy, damage evident in nut shucks in Autauga, Covington, and other central and southern counties. (Scott et al.). OKLAHOMA - Moderate in Mayes County pecans. (Okla. Coop. Sur.).

TWIG GIRDLER (*Oncideres cingulata*) - SOUTH CAROLINA - Adults damaging pecans in Laurens and Newberry Counties. (Nettles et al., Oct. 24). OKLAHOMA - Adults moderate in Choctaw County pecans. (Okla. Coop. Sur.).

PECAN WEEVIL (*Curculio caryae*) - ALABAMA - Late larvae light in some falling pecans in Morgan County; adult emergence expected in 3-4 weeks. (Rutledge).

PEAR-SLUG (*Caliroa cerasi*) - NEW MEXICO - Moderate to heavy, damaging cherry and pear trees at Espanola, Rio Arriba County. (Heninger).

ORNAMENTALS

A FALSE SPIDER MITE (*Brevipalpus russulus*) - FLORIDA - Taken on Thanksgiving cactus (*Zygocactus* sp.) in greenhouse at St. Augustine, St. Johns County, September 20, 1967, by A. E. Graham. Det. by E. W. Baker. This is a new Department of Plant Industry State record and new host record. Taken on 75 of 100 Thanksgiving cacti October 4 at San Mateo, Putnam County, for new county record. (Graham).

FULLER ROSE WEEVIL (*Pantomorus cervinus*) - CALIFORNIA - Adults heavy, damaged pyracantha leaves at Pacific Grove, Monterey County. (Cal. Coop. Rpt.).

PINEAPPLE SCALE (*Diaspis bromeliae*) - CALIFORNIA - Adults heavy on bromeliad nursery stock at Valley Center, San Deigo County. (Cal. Coop. Rpt.).

A JAPANESE WEEVIL (*Pseudocneorhinus bifasciatus*) - MARYLAND - Adult damage heavy to *Mahonia* sp. in Howard County. (U. Md., Ent. Dept.).

FOREST AND SHADE TREES

BARK BEETLES - VIRGINIA - Increased greatly past month but not epidemic. Spot infestations totaled 35 in Chesterfield County and 40 in Henrico County. *Ips* spp. and *Dendroctonus* spp. involved in death of loblolly pine in stands throughout Sussex district. *Ips* spp. on up to 70 trees in scattered areas of Westmoreland, Caroline, King and Queen, and Richmond Counties. *Ips* spp. and *D. frontalis* active in most counties in Richmond district; most numerous (15 spots) in Hanover County. Active in Nottoway, Lunenburg, Mecklenburg, Halifax, and Charlotte Counties; *Ips* spp. dominant. *Ips* spp. and *Dendroctonus* spp. involved in death of 2 acres of Virginia pine at 3 locations in Louisa County; active in few spots in Henry, Pittsylvania, Roanoke, and Patrick Counties. (For. Pest Sur. Rpt., Sept. Sum.).

PINE WEEVILS - VIRGINIA - *Pissodes strobi* damage extensive to white pine in Floyd and Montgomery Counties. *Hylobius pales* damaging 36-acre loblolly pine plantation in Stafford County; loss 5 percent. (For. Pest Sur. Rpt., Sept. Sum.).

AN ERIOCOCCID SCALE (*Eriococcus araucariae*) - CALIFORNIA - Heavy on Norfolk Island-pines at Solana Beach, San Diego County. (Cal. Coop. Rpt.).

RED-HEADED PINE SAWFLY (*Neodiprion lecontei*) - VIRGINIA - Young larvae defoliated shortleaf and Virginia pine at 4 locations in Wise County and 2 locations in Scott County. (For. Pest Sur. Rpt., Sept. Sum.).

RED-HUMPED CATERPILLAR (*Schizura concinna*) - CALIFORNIA - Heaviest ever recorded in State. Continues to defoliate trees. (Cal. Coop. Rpt.).

FALL WEBWORM (*Hyphantria cunea*) - NEW MEXICO - Moderate to heavy on elm, poplar, and cottonwoods in Luna County (Hare); damage heavy on same hosts in most of Dona Ana County. (N.M. Coop. Rpt.).

FALL CANKERWORM (*Alsophila pometaria*) - NORTH DAKOTA - More numerous than in 1966; adults and egg masses evident on buildings, trees, and tanglefoot bands in Fargo area, Cass County. (Teter).

APHIDS - MARYLAND - *Lachnus salignus* heavy on weeping willows at several locations throughout State. *Longistigma caryae* heavy, laying eggs on sycamore trees at College Park, Prince Georges County. (U. Md., Ent. Dept., Oct. 20).

MAN AND ANIMALS

MOSQUITOES - LOUISIANA - Larvae collected in Jefferson Parish October 20-26: *Aedes vexans*, *A. sollicitans*, *Anopheles quadrimaculatus*, *A. crucians*, *Culex pipiens quinquefasciatus*, *C. restuans*, and *C. salinarius*. Light trap collections decreasing; *C. salinarius* dominant. (Stokes). OKLAHOMA - *Psorophora confinnis*, *P. ferox*, and *Aedes* spp. annoying in Payne and Muskogee Counties. (Okla. Coop. Sur.). UTAH - Less numerous than during October 5-12 in Logan and Petersboro meadows, Cache County. Occasionally found in Logan and Benson community areas (Crowe, Knowlton); *Aedes dorsalis* outbreak heavy in Ogden Bay and bird refuge area of Weber County due to September 8 flood (Fronk, Knowlton).

HORN FLY (*Haematobia irritans*) - MISSISSIPPI - Adults ranged 30-40 per animal on 10 penned Black Angus bulls in Oktibbeha County. (Dinkins). OKLAHOMA - Averaged 400 per head on 200 cattle in Major County; less than 25 per head in Cherokee County; 50 per head on yearlings and 25 per head on mature cows in Payne County. (Okla. Coop. Sur.).

STABLE FLY (*Stomoxys calcitrans*) - NEBRASKA - Ranged 0-3, 10-15, and 20-25 per leg on 3 feedlot herds in Lancaster County. (Campbell).

FACE FLY (*Musca autumnalis*) - NEBRASKA - Averaged 3 per face on pastured cows near Lincoln, Lancaster County. (Perdue).

SCREW-WORM (*Cochliomyia hominivorax*) - Total of 99 cases reported in U.S. October 22-28 as follows: TEXAS - Bandera 4, Bee 1, Bexar 2, Blanco 5, Caldwell 3, Crockett 1, De Witt 1, Edwards 4, Frio 2, Gillespie 7, Gonzales 1, Hamilton 1, Hays 3, Kendall 2, Kerr 7, Kimble 3, Kinney 5, Lampasas 1, Llano 1, Mason 3, Maverick 4, Medina 7, Menard 2, Pecos 2, Presidio 3, Real 4, San Saba 1, Sutton 1, Travis 1, Uvalde 6, Val Verde 7, Ward 1, Williamson 1, Zavala 1. ARIZONA - Yuma 1. Total of 295 cases reported in portion of Barrier Zone in Republic of Mexico as follows: Baja California 2, Territorio sur de Baja California 54, Sonora 23, Chihuahua 88, Coahuila 106, Nuevo Leon 6, Tamaulipas 16. Total of 61 cases reported in Mexico south of Barrier Zone. Barrier Zone is area where eradication operation underway to prevent establishment of self-sustaining population in U.S. Sterile screw-worm flies released: Arizona 170,000, Texas 69,224,000, California 400,000, Mexico 48,307,200. (Anim. Health Div.).

FEDERAL AND STATE PLANT PROTECTION PROGRAMS

CITRUS BLACKFLY (*Aleurocanthus woglumi*) - MEXICO - *Chemical Control Zone* - Inspected 36,649 trees on 595 properties in States of Tamaulipas and Nuevo Leon; found 4 trees and 4 leaves infested on 3 properties one mile south of Linares, Nuevo Leon. (PPC Mex. Reg., Sept. Rpt.).

EUROPEAN CHAFER (*Amphimallon majalis*) - MASSACHUSETTS - Cooperative control treatment planned to begin October 16 on 915 acres at 5 locations. (PPC East. Reg., Sept. Rpt.).

GYPSY MOTH (*Porthetria dispar*) - PENNSYLVANIA - Released 96,000 encyrtid wasps (*Ooencyrtus kuwanai*) to parasitize egg masses at 10 positive trap sites in Monroe County. NEW JERSEY - Trapping completed in State; 197 males taken in 121 traps in 12 counties. (PPC East. Reg., Sept. Rpt.).

JAPANESE BEETLE (Popillia japonica) - KENTUCKY - Adults found in Fleming County during September for new county record. (PPC Cent. Reg.). MARYLAND - Treated 600 acres September 25 at Friendship International Airport at Baltimore. (PPC East. Reg.).

PINK BOLLWORM (Pectinophora gossypiella) - NEW MEXICO - Larvae increasing greatly in green bolls in most areas; present where absent in past. (N.M. Coop. Rpt.). First to fourth instars in green bolls on top quarter to top eighth of plants in Luna County. (Hare). ARIZONA - Infested 45 percent of 35-acre field in San Simon area, Cochise County, and 100 percent of green bolls in top of untreated and undefoliated cotton in Yuma County; exit holes in bolls at Cochise and north of Willcox in Cochise County. (Ariz. Coop. Sur.). Limited surveys during September continued to indicate most cotton infested; some very light, some heavy. All inspected okra fields infested (included 1 backyard planting at least 0.25 mile from any Yuma County cotton). Treatment of 71,440 acres completed in northern part of county. CALIFORNIA - Late-irrigated cotton in southern desert areas showed new top growth with blooms and small bolls. If these remain green, late buildup expected. Increase in moth activity noticed in Borrego Springs area of San Diego County and Coachella Valley in Riverside County. Four additional moths taken from small isolated experimental cotton plot at Riverside; cotton immediately plowed under. This plot about 50 miles from nearest commercial cotton in Coachella Valley. Treatment completed during September on 368,651 cumulative acres as follows: Imperial County - Bard Valley 42,663, Imperial Valley 123,464; Riverside County - Palo Verde Valley 173,832, Coachella Valley 1,760; San Bernardino County - Needles 2,624; Kern County - Cantil 24,308. (PPC West. Reg.). NEVADA - Trapped during October 18-27 in Pahrump Valley, Nye County: 2 females and 14 males in sex lure-argon light traps, trapped 3 males by sex lure only. (Nev. Coop. Rpt.).

WHITE-FRINGED BEETLES (Graphognathus spp.) - VIRGINIA - Found 6 adults for first time in City of Portsmouth September 18; extensions found at Newport News and Hampton. (PPC East. Reg.).

INSECT DETECTION

New North American Record

A SEED CHALCID (Megastigmus pistaceae Walker) - CALIFORNIA - Larva taken on Pistacia vera var. kerman at Plant Introduction Station, Chico, Butte County, October 6, 1967, by J. Street. Det. by M. Wasbauer, confirmed by B. D. Burks. (p. 971).

New State Records

SOUTHERN CHINCH BUG (Blissus insularis) - CALIFORNIA - Collected on St. Augustine grass in Whittier, Los Angeles County, September 26, 1967, by J. Emoto. Det. by J. L. Herring. (p. 970).

A FALSE SPIDER MITE (Brevipalpus russulus) - FLORIDA - Taken on Thanksgiving cactus (Zygocactus sp.) in greenhouse at St. Augustine, St. Johns County, September 20, 1967, by A. E. Graham. Det. by E. W. Baker. (p. 972).

New County Records

A FALSE SPIDER MITE (Brevipalpus russulus) - FLORIDA - Putnam County. (p. 972).

JAPANESE BEETLE (Popillia japonica) - KENTUCKY - Fleming County. (p. 974).

WHITE-FRINGED BEETLES (Graphognathus spp.) - VIRGINIA - City of Portsmouth. (p. 974).

HAWAII INSECT REPORT

Turf, Pasture - Larvae and adults of a PYRAUSTID MOTH (*Herpetogramma* licarsisalis* (Walker)) very heavy on golf courses in Wahiawa and Barbers Point Naval Air Station and in memorial parks in Kaneohe, Oahu; light trap catches indicate pest widespread on island. (Greenwell, Higa).

Vegetables - POTATO TUBERWORM (*Phthorimaea operculella*) adults and damage on leaves, stems, and tubers heavy in potato planting near Molokai Airport. (Miyahira, Yamamoto). MELON FLY (*Dacus cucurbitae*) adults heavy in backyard gardens in Lanai City, Lanai; bitter melon (*Momordica charantia*) heavily damaged. (Miyahira).

Ornamentals - All stages of HAWAIIAN THRIPS (*Thrips hawaiiensis*) moderate, severely damaging cattleya and dendrobium orchids in Woodlawn area of Honolulu; flowers unmarketable. (Carter).

Beneficial Organisms - PUNCTURE-VINE STEM WEEVIL (*Microlarinus lypriformis*) caused much damage to puncture-vine (*Tribulus cistoides*) on coastal strip at Waianae, Oahu. No evidence of plant in area on Molokai where this weevil previously active. (Davis, Miyahira). A CARNIVOROUS SNAIL (*Conaxis quadrilateralis*)- Hundreds of this introduced predator observed on Makiki Round Top Drive in Honolulu where giant African snail (*Achatina fulica*) formerly very heavy. (Davis). LANTANA HISPID (*Uroplata girardi*) leaf mines and adults heavy in Ulupalakua, Maui; established area increasing. Adults light, larvae and pupae moderate along Mahana Road, Lanai, where species now established. (Miyahira). Larval infestations of LANTANA SEED FLY (*Ophiomyia lantanae*) in lantana seeds 75 percent on Lanai, 85 percent in various localities on Molokai, and 75 percent in Kula and Ulupalakua area on Maui. (Miyahira).

* Change in generic name: Amsel, H. G. 1954. Bol. de Entomologia Venezolana 10:176. Actual date of publication is 1956. Carried in CEIR 17(41):903, 17(42):948, and 17(43):963 as *Psara licarsisalis* (Walker)).

LIGHT TRAP COLLECTIONS

FLORIDA - Gainesville - 10/24, BL - Armyworm (*Pseudaletia unipuncta*) 8, black cutworm (*Agrotis ipsilon*) 1, granulate cutworm (*Feltia subterranea*) 1. MISSISSIPPI - Stoneville - 10/21-27, BL, 43-83°F - Armyworm 95, beet armyworm (*Spodoptera exigua*) 477, black cutworm 77, cabbage looper (*Trichoplusia ni*) 2, corn earworm (*Heliothis zea*) 79, fall armyworm (*S. frugiperda*) 85, granulate cutworm 96, variegated cutworm (*Peridroma saucia*) 9, yellow-striped armyworm (*Prodenia ornithogalli*) 10. SOUTH CAROLINA - Charleston - 10/23-29, BL, 38-79°F, no precip. - Armyworm 118, black cutworm 43, corn earworm 4, fall armyworm 4, granulate cutworm 17, yellow-striped armyworm 1, variegated cutworm 2. TEXAS - Waco - 10/21-27, BL - Armyworm 480, beet armyworm 39, black cutworm 7, cabbage looper 64, corn earworm 25, fall armyworm 135, granulate cutworm 195, tobacco budworm (*H. virescens*) 5, variegated cutworm 167, yellow-striped armyworm 28.

CORRECTIONS

CEIR 16(39):494 - EUROPEAN CRANE FLY (*Tipula paludosa*) - Line 2 under Description should read: "...brown, with 14 segments,..."

CEIR 17(43):956 - A generic name change. A PYRAUSTID MOTH (Psara phaeopteralis) should read (*Herpetogramma* phaeopteralis). Amsel, H. G. 1954. Bol. de. Entomologia Venezolana 10:176. Actual date of publication is 1956.

WEATHER OF THE WEEK ENDING OCTOBER 30

HIGHLIGHTS: Violent storms, heavy snow, and cold temperatures characterized the weather during the past week.

PRECIPITATION: Severe weather associated with a vigorous cold front struck a wide area from Michigan to the central gulf coast Tuesday and Wednesday. Tornadoes occurred in seven States--from Missouri to Ohio and in Tennessee, Mississippi, and Alabama. Monday morning, October 30, tornadoes killed 2 persons, injured 200, and caused extensive property damage in the Gulfport area of Mississippi. A large area from Michigan to Texas received more than an inch of rain with spots in Oklahoma receiving 4 to 6 inches or more. As the cold front continued eastward, it produced rainfall totals exceeding 1 inch from the Ohio River Valley to the Appalachians. The Pacific Northwest received rain on several days; it was heaviest early and late in the week. Totals ranged from 1 to 3 inches along the coast to 6 to 9 inches on the western slopes of the Cascades and generally less than an inch farther inland. The desert Southwest--Arizona and nearby portions of neighboring States continued rainless. The first major snow of the season hit the northern Great Plains and the Great Lakes region. Ironwood, Michigan, received 18 inches with totals ranging downward to 7 inches in northern Illinois, and to 1 to 3 inches in northern Missouri.

TEMPERATURE: The coldest weather of the season came to the Pacific Northwest with daily maximums in the 40's and 50's. The Southwest continued warmer than normal. Brisk southerly winds over the East sent temperatures into the 60's and 70's early in the week. Cold air surges hit mid-America early and late in the week, dropping temperatures 40° or more. Goodland, Kansas, registered 76° Monday afternoon and 28° by midnight Tuesday. Extensive cloudiness prevented the temperatures from falling below the 30's over much of the Plains. Subfreezing temperatures occurred in the southern Appalachians and much of the Piedmont; Augusta, Georgia, registered 30° Sunday morning. Maximums in the 70's, however, occurred from the southwestern deserts to Florida. At the end of the week, a new surge of cold air and northerly winds swept southward across the Plains. (Summary supplied by Environmental Data Service, ESSA).

Weather continued from page 968.

SURVEY METHODS

Selected References 1962*

Part IV

Additional copies of Parts I through IV of this bibliography are available from Survey and Detection Operations.

POPULATION MEASUREMENT

BANKS, C. J. and BROWN, E. S. 1962. A comparison of methods of estimating population density of adult sunn pest, *Eurygaster integriceps* Put. (Hemiptera, Scutelleridae) in wheat fields. Ent. Expt. Appl. 5:255-260.

BOYER, W. P., WARREN, L. O. and LINCOLN, C. 1962. Cotton insect scouting in Arkansas. Ark. Agr. Expt. Sta. Bul. 656, 40 pp.

DUFFEY, E. 1962. A population study of spiders in limestone grassland; description of study area, sampling methods and population characteristics. J. Anim. Ecol. 31(3):571-599.
Great Britain

DUMAS, B. A., BOYER, W. P. and WHITCOMB, W. H. 1962. Effect of time of day on surveys of predaceous insects in field crops. Fla. Ent. 45(3):121-128. Ref.

EDWARDS, R. L. 1962. The importance of timing in adult grasshopper surveys. J. Econ. Ent. 55(2):263-264.

HIRATA, S. 1962. Comparative studies on the population dynamics of important lepidopterous pests on cabbage. Jap. J. Appl. Ent. & Zool. 6(3):200-207. Engl. Sum.

KOBAYASHI, J. 1962. Studies on the spatial distribution and methods of sampling for the assessment of population and damage of rice stem borers. Japan Dept. Agr. Forest Develop. Bur. Plant Protect. Sect. Spec. Rpt. Pre-Exam. Blights Harmful Insects 13, 82 pp., map. Ref. In Jap., Engl. Sum.

LECOMTE, J. 1962. Techniques for studying populations of insect pollinators. Ann. de l'Abeille 5(3):201-213. In Fr. Translation No. 14415.

PARADIS, R. O. and LEROUX, E. J. 1962. A sampling technique for population and mortality factors of the fruit-tree leaf roller, *Archips argyrospilus* (Wlk.) (Lepidoptera: Tortricidae), on apple in Quebec. Canad. Ent. 94(6):561-573. Refs.

SATCHELL, J. E. and MOUNTFORD, M. D. 1962. A method of assessing caterpillar populations on large forest trees, using a systemic insecticide. Ann. Appl. Biol. 50(3):443-450. Refs.

STEVENS, R. E. and STARK, R. W. 1962. Sequential sampling for the lodgepole needle miner, *Evagora milleri*. J. Econ. Ent. 55(4):491-494.

WADA, Y. 1962. Studies on the population estimation for insects of medical importance. II. A method of estimating the population size of larvae of *Aedes togoi* in the tide-water rock pool. Endemic Dis. Bul. (Nagasaki Univ.) 4(2):141-156.

---

* Additional citations for 1963 - 1966 are included at the end of the 1962 listing

WATT, K. E. F. 1962. Use of mathematics in population ecology. Ann. Rev. Ent. 7:243-260.

WILLIAMS, T. R. and OBENG, L. 1962. A comparison of two methods of estimating changes in *Simulium* larval populations, with a description of a new method. Ann. Trop. Med. and Parasitol. 56(3):359-361.

REARING

CALLAHAN, P. S. 1962. Techniques for rearing the corn earworm, *Heliothis zea*. J. Econ. Ent. 55(4):453-457.

CHUMAKOVA, B. M. 1962. Experiments in rearing a predatory beetle, *Cryptolaemus montrouzieri* Muls. on artificial diet. Zeszyty Prob. Postepow Nauk Roln. 35:195-200. In Rus., Ger. Sum.

DAMODAR, P., WAL, Y. C. and PERTI, S. L. 1962. A note on laboratory culturing of bed-bugs. Indian J. Malariol. 16(3):227-230.
Cimex lectularius

DAVID, W. A. L. and GARDINER, B. O. C. 1962. Observations on the larvae and pupae of *Pieris brassicae* (L.) in a laboratory culture. Bul. Ent. Res. 53(2):417-436.

DUTKY, S. R., THOMPSON, J. V. and CANTWELL, G. E. 1962. A technique for mass rearing the greater wax moth (Lepidoptera: Galleriidae). Ent. Soc. Wash. Proc. 64(1):56-58.
Galleria mellonella

FRINGS, H. and FRINGS, M. 1962. Simplified methods for laboratory maintenance of saltatory Orthoptera. J. Econ. Ent. 55(6):1019-1020.

GARCES, F. A. 1962. Note on a provision for the programming of environmental temperature in small chambers. Agron. Lusitana 24(4):301-306. In Por., Engl. Sum.

GETZIN, L. W. 1962. Mass rearing of virus-free cabbage loopers on an artificial diet. J. Insect Path. 4(4):486-488.
Trichoplusia ni

GLASS, E. H. and HERVEY, G. E. R. 1962. Continuous rearing of the red-banded leaf roller, *Argyrotaenia velutinana*. J. Econ. Ent. 55(3):336-340.

HASKINS, K. P. F. 1962. A new system for rearing the American cockroach. Entomologist 95(1184):27-29.
Periplaneta americana

JOHNSON, N. E. 1962. Rearing of Douglas-fir beetle broods in waxed slabs. Ent. Soc. Amer. Ann. 55(6):659-663. Refs.

KIRKPATRICK, T. H. 1962. Methods of rearing *Heliothis* species, and attempted crossbreeding. Queensl. J. Agr. Sci. 19(4):565-566. Ref.

MARSHALL, V. G. and KEVAN, D. K. M. 1962. Preliminary observations on the biology of *Folsomia candida* Willem, 1902 (Collembola: Isotomidae). Canad. Ent. 94(6):575-586.

MCDONALD, W. A. 1962. A technique for rearing myiasis-producing fly larvae. Ent. Soc. South. Africa J. 25(1):149.
Cordylobia anthropophaga

MCGINNIS, A. J. and KASTING, R. 1962. A method of rearing larvae of the wheat stem sawfly *Cephus cinctus* Nort. (Hymenoptera: Cephidae), under artificial conditions. Canad. Ent. 94(6):573-574. Refs.

MEISTER, G. 1962. Biological observations of *Musca domestica* L. during laboratory rearing. (A contribution to the problem of standardization of rearing methods). Z. f. Tropmed. u. Parasitol. 13(1):102-133. In Ger., Engl. Sum.

MELLER, H. 1962. Comparative observations on the biology of *Anopheles atroparvus* and *Anopheles stephensi* under laboratory conditions. Z. f. Tropmed. u. Parasitol. 13(1):80-102. In Ger., Engl. Sum.
Includes rearing techniques

MITTLER, T. E. and DADD, R. H. 1962. Artificial feeding and rearing of the aphid, *Myzus persicae* (Sulzer), on a completely defined synthetic diet. Nature (London) 195(4839):404.

MOORE, I. 1962. Further investigations on the artificial breeding of the olive fly--*Dacus oleae* Gmel.--under aseptic conditions. Entomophaga 7(1):53-57.

NEWMAN, A. 1962. Rearing *Macrothylacia rubi* L. (Lep., Lasiocampidae). Ent. Gaz. 13(2):105.

PIELOU, D. P. 1962. Note on an escape-proof method for rearing and handling *Drosophila melanogaster* Meig. Canad. J. Zool. 40(2):365-367.

VANDERZANT, E. S., RICHARDSON, C. D. and FORT, S. W., JR. 1962. Rearing of the bollworm on artificial diet. J. Econ. Ent. 55(1):140.

EQUIPMENT AND TECHNIQUES

BAILEY, S. F., ELIASON, D. A., and ILTIS, W. G. 1962. Some marking and recovery techniques in *Culex tarsalis* Coq. flight studies. Mosquito News 22(1): 1-10.

BAR-ZEEV, M. 1962. A simple technique for obtaining standard numbers of newly hatched mosquito larvae. Mosquito News 22(2):171-175.
Particularly *Aedes aegypti*

BATRA, H. N. and SARUP, S. 1962. Technique of mass-breeding of the painted bug, *Bagrada cruciferarum* Kirk. (Heteroptera: Pentatomidae). Indian Oilseeds J. (Hyderabad). 6(2):135-143. Fig. Refs.

BJEGOVIC, P. S. 1962. A new method of rearing the egg-parasite of the gypsy moth, *Ooencyrtus kuwanae* How. Arh. Poljopr. Nauke (Belgrade) 15(48):105-113. Refs. In Serbo-Croat., Engl. Sum.

DENNIS, N. M. and DECKER, R. W. 1962. A method and machine for detecting living internal insect infestation in wheat. J. Econ. Ent. 55(2):199-203.

EDDY, G. W., ROTH, A. R. and PLAPP, F. W., JR. 1962. Studies on the flight habits of some marked insects. J. Econ. Ent. 55(5):603-607.

EVERETT, T. R. and RAY, J. O. 1962. The utility of sealed punctures for studying fecundity and egg laying by the boll weevil. J. Econ. Ent. 55(5):634-636.

HAZELTINE, W. E. 1962. A new insect clearing technique. Kans. Ent. Soc. J. 35(1):165-166.

KELLOGG, F. E. and WRIGHT, R. H. 1962. The olfactory guidance of flying insects. III. A technique for observing and recording flight paths. Canad. Ent. 94(5):486-493.
Using various photographic methods; describes cages

KIRKPATRICK, R. L. 1962. Rubber-bulb aspirators to handle minute insects. J. Econ. Ent. 55(3):411.

KULMAN, H. M. and HODSON, A. C. 1962. A sampling unit for the jack-pine budworm, Choristoneura pinus. J. Econ. Ent. 55(5):801-802.

LASTER, M. L. and FURR, R. E. 1962. A simple technique for recovering insects from sorghum heads in insecticide tests. J. Econ. Ent. 55(5):798.

MCMURTRY, J. A. and SCRIVEN, G. T. 1962. The use of agar media in transporting and rearing phytoseiid mites. J. Econ. Ent. 55(3):412-414.

MOUCHA, J. 1962. Collecting methods and preparation techniques for horse flies. Angew. Parasitol. 3(3/4):90-93. In Ger., Engl. Sum.
Tabanidae

NICHOLLS, C. F. 1962. A machine for changing the positions of a pair of directional light-traps to eliminate positional effects. Canad. Ent. 94(2):200-204.

OLDERSHAW, D. H. 1962. Some techniques in insect photography. Ent. Soc. Brit. Columbia Proc. 59:51-52.

RENTZ, D. C. 1962. A technique useful for the dry preservation of soft-bodied Orthoptera. Wasmann J. Biol. 20(1):159-160

ROBERTS, R. B. 1962. A cage to contain small insects during pollination studies. J. Econ. Ent. 55(2):267-268.

SHAZLI, A. 1962. Methods of measuring the spiracular activity of insects. II-III. Soc. Ent. d'Egypte. Bul. 46(55):219-226.

SOUTHWOOD, T. R. E. and PLEASANCE, H. J. 1962. A hand-operated suction apparatus for the extraction of arthropods from grassland and similar habitats, with notes on other models. Bul. Ent. Res. 53(1):125-129.
Insects included

TAFT, H. M. and AGEE, H. R. 1962. A marking and recovery method for use in boll weevil movement studies. J. Econ. Ent. 55(6):1018-1019.

TRPIS, M. 1962. Apparatus for the trimming of foamed polystyrene for the use in insect collections. Mosquito News 22(3):307-309.

WHITCOMB, W. H., WALL, H. C. and WALL, M. L. 1962. A technique for terminating diapause of southwestern corn borer larvae. Kans. Ent. Soc. J. 35(3):315-316. Refs.

WILKEY, R. F. 1962. A simplified technique for clearing, staining and permanently mounting small arthropods. Ent. Soc. Amer. Ann. 55(5):606.

WILSON, L. F. 1962. A portable device for mass-collecting or sampling forage-inhabiting arthropods. J. Econ. Ent. 55(5):807-808.

YUSHIMA, T. and TOMISAWA, J. 1962. A method for obtaining eggs of the rice stem maggot, Chlorops oryzae Matsumura, on paper. Jap. J. Appl. Ent. & Zool. 6(1):78-79. In Jap.

TRAPS

ANDREEV, S. A., BUBNOV, G. M., MARTENS, B. K. and MOLCHANOVA, V. A. 1962. Automatic light-traps. 5 pp.
Translation available in Zashchita Rastenii ot Vreditelei i Boleznei 1:49-50

COON, B. F. and RINICK, H. B., JR. 1962. Cereal aphid capture in yellow baffle trays. J. Econ. Ent. 55(3):407-408.

DEAY, H. O. 1962. Present use of light traps in Indiana in 1961. Ent. Soc. Amer. No. Cent. Br. Proc. 17:40.

FROST, S. W. 1962. Winter insect light-trapping at the Archbold Biological Station, Florida. Fla. Ent. 45(4):175-190, map.

HARPER, A. M. and STORY, T. P. 1962. Reliability of trapping in determining the emergence period and sex ratio of the sugar-beet root maggot Tetanops myopaeformis (Roder) (Diptera: Otitidae). Canad. Ent. 94(3):268-271. Refs.

HORSFALL, W. R. 1962. Trap for separating collections of insects by interval. J. Econ. Ent. 55(5):808-811.

KOVACS, L. 1962. Ten years of light trap survey in Hungary, Budapest. Magyar Nemzeti Muz. Evkon. 54:365-375. In Ger.
Insects

LANE, C. 1962. A record of Heliothis peltigera (Schiff.) (Lep., Noctuidae) together with notes on catches in a mercury-vapour trap at Ashton, Northamptonshire and Elsfield, Oxfordshire. Ent. Mon. Mag. 98(1180/1183):215.

LEGNER, E. F. and DAVIS, D. W. 1962. Tests with attractants and a simple trap for the European earwig, Forficula auricularia. J. Econ. Ent. 55(6):1006-1007.

MADSEN, H. F. and SANBORN, R. R. 1962. Black light traps help determine flights of codling moths and other deciduous fruit pests. Calif. Agr. 16(2):12-13.
Carpocapsa pomonella

PARENCIA, C. R., JR., COWAN, C. B., JR. and DAVIS, J. W. 1962. Relationship of Lepidoptera light-trap collections to cotton field infestations. J. Econ. Ent. 55(5):692-695.

PEEZ, A. VON. 1962. On collecting beetles with bait traps in trees. Nachrbl. der Bayer. Ent. 11(12):121-123. In Ger.

PIECZYNSKI, E. 1962. Trapping method in the study of water mites (Hydracarina). Poznan. Inst. Ochrony Roslin. B. 18:153-156. In Polish, Engl. Sum.

SIMISON, F. M. 1962. Trapping insects with light. Org. Gard. & Farming 9(4): 39-40.

SMITH, P. W. 1962. The use of blacklight insect traps as an entomological tool. Ent. Soc. Amer. No. Cent. Br. Proc. 17:38-39.

SUDIA, W. D. and CHAMBERLAIN, R. W. 1962. Battery-operated light trap, an improved model. Mosquito News 22(2):126-129.

TAYLOR, L. R. 1962. The absolute efficiency of insect suction traps. Ann. Appl. Biol. 50(3):405-421. Refs.

TAYLOR, L. R. 1962. The efficiency of cylindrical sticky insect traps and suspended nets. Ann. Appl. Biol. 50(4):681-685. Refs.

TOMLINSON, W. E., JR. 1962. The response of cranberry fruitworm to black light. J. Econ. Ent. 55(4):573.

TREAT, A. E. 1962. Comparative moth catches by an ultrasonic and a silent light trap. Ent. Soc. Amer. Ann. 55(6):716-720. Refs.

ZEMKOVA, R. I. 1962. Use of electric light traps in mountain area of Western Sayan. Zashch. Rast. ot Vred. i Boleznei 1962(6):45. In Rus.

ATTRACTANTS

ALLEN, N., KINARD, W. S. and JACOBSON, M. 1962. Procedure used to recover a sex attractant for the male tobacco hornworm. J. Econ. Ent. 55(3):347-351.

GOUCK, H. K. and GILBERT, I. H. 1962. Responses of mosquitoes and stable flies to a man in a light-weight rubber diving suit. J. Econ. Ent. 55(3):386-392.

OUYE, M. T. and BUTT, B. A. 1962. A natural sex lure extracted from female pink bollworms. J. Econ. Ent. 55(3):419-421.

* *

ADDITIONAL REFERENCES 1963 - 1966

REARING

BRUEL, W. E. VAN DEN and BOLLAERTS, D. 1966. Method of rearing and observation applicable to *Pediculoides ventricosus* Newpt. and other acarid species or small insects. Ghent. Rijksfac. Landbouwwetensch. Meded. 31(3):747-757. In Fr., Engl. Sum.

CHANDLER, P. J. 1966. Rearing of *Rondaniella dimidiata* Mg. (Dipt., Mycetophilidae). Ent. Mon. Mag. 102(1220/1222):72.

CLARK, E. W. and OSGOOD, E. A., JR. 1964. A simple laboratory technique for rearing *Ips calligraphus*. S. East. Forest Expt. Sta. Res. Note No. 31, 3 pp.

MITCHELL, S., TANAKA, N. and STEINER, L. F. 1965. Methods of mass culturing melon flies and oriental and Mediterranean fruit flies. U.S. Dept. Agr. ARS 33-104, 22 pp.

EQUIPMENT AND TECHNIQUES

COOKE, J. A. L. 1966. A convenient design of pooter for the capture of small carnivorous arthropods. Ent. Mon. Mag. 102(1223/1225):87.
Aspirators

LAWSON, F. R., GENTRY, C. R. and STANLEY, J. M. 1963. Effect of light traps on hornworm populations in large areas. U.S. Agr. Res. Serv. ARS 33-91, 18 pp.
Includes techniques to determine length of life of *Manduca sexta* and *M. quinquemaculata*

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Coop. Econ. Ins. Rpt.
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